ENTROPY AND INTERPOLATION BASED DIGITAL WATERMARKING

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ABSTRACT

The protection and integrity which are one of the most important aspects of information during transmission is discussed in this paper. The importance of transmitting digital information in digital watermarking system and the dissymmetric digital watermarking framework lived on media content communication is also being discussed in this paper. Then we apply Discrete Wavelet Transform (DWT) for watermarking embedding algorithm to keep the balance between watermarks' imperceptibility and its robustness while the data is being sent on the communication channel.

KEYWORDS: Discrete Wavelet Transform (DWT), Gray Scale, Peak Signal to Noise Ratio (PSNR)

INTRODUCTION

Digital Watermarking works on the principle of concealing information from digital data. A special software package is used to detect the presence of concealed data in all its copies regardless of attempts to damage it. Digital watermarking technology makes use of the actual fact that the human eye has solely a restricted ability to look at changes. The observer doesn't notice any difference in small modifications of the color values of the image as they are corrected.

Digital watermarks quality is judged mainly in two ways: 1.It should be resistant to all intentional and unintentional attacks and 2.The embedded watermark should not get degraded from the image quality. As the resistance of a watermark against attacks is higher, the risk of image quality getting reduced is lower.

The types of information and data focused on during our research are:
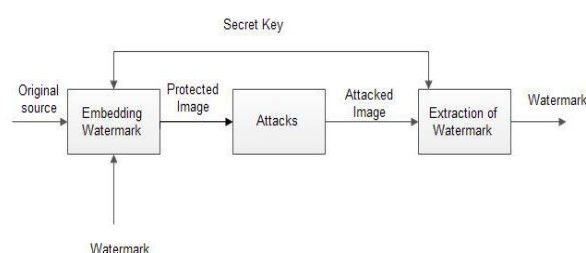
- Digital Images

- Digital Audio, and

- Digital Videos

Figure 1: Digital Watermarking Methods

The issue of copyright protection and their related data concealment techniques is considered very important in academic as well in the areas of industrial. Most information concealment/data hiding schemes distort the cover media so as to embed the secret key. Though the distortion is often very less and in cognoscible, the reversibility is crucial to some sensitive applications. In various legal operations, it is needed to be able to reverse the marked image back to the cover image for legal consideration. Also high accuracy is being demanded in remote sensing and military imaging[7].

Image processing depends on compression that helps in reduction of file size for transmission of huge amount of data in an exceedingly stipulated and reduced time. The signal or image clearance and simplification that are unit a part of denoising or filtering is one of the common goals of image compression which is being provided by wavelet analysis. On the basis of compression ratio and PSNR, a comparative study considering the values of image quality has been delivered.

LITERATURE SURVEY

Qiu Yang et.al [3] This paper mainly introduces the entropy masking model in three different domains and give experiment report about utilizing spatial domain and DWT domain entropy masking model in the similar system of watermarking. In addition, we also analyze the advantages and disadvantages of these models from the aspects of imperceptibility and robustness through our simulation experiment.

Yana Zhang et.al [2] In this paper we discuss the essence of information transmission in digital watermarking system and the dissymmetric digital watermarking framework lived on media content communication. Then we propose a universal entropy masking model for watermarking embedding algorithm to keep the balance between watermarks' imperceptibility and its robustness.

E. Chrysochos et.al [4] This paper, introduces a new reversible watermarking scheme which are resistant to geometrical attacks are present. The proposed scheme does not require the original image for the extraction the watermark, and also does not induces the noticeable distortion during the watermarking procedure. Various watermarked images show robustness against geometrical attacks.

METHODOLOGY

In DWT domain SYMLET wavelet for watermarking is used, first of all, an initial image is taken as input image. Entropy is being calculated on the basis of interpolation which is applied on the original image.

For embedding the watermark entropy in three different domain namely DCT, Gray Scale and DWT is calculated. After this, watermark is embedded in the original image using DWT domain and PSNR values are calculated on the basis of which desired results are obtained. Maximum Entropy is found in DWT.

Algorithm

Step 1: An image is taken as an input image.

Step 2: For watermark embedding the entropy in DWT domain is calculated.
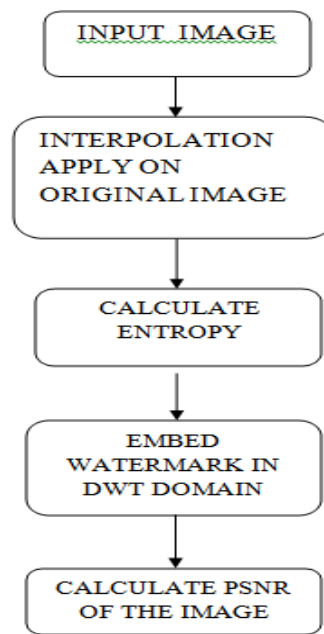
Step 3: Now, Determine the maximum entropy in DWT Domain.

Figure 2(a): Flow Chart of Proposed Methodology

Figure 2(b): Original Image

Figure 2(c): Watermark Image

Figure 2(d): Watermarked Image

EXPERIMENT AND RESULTS

The code of proposed system is implemented using MATLAB 2012b on an Intel i3 processor. An image database of various gray scale images is tested. The modifications in some of the images which are caused after embedding the watermark are presented in this section. The common practice is to measure the quality of the watermarked image. The results are presented above in Figure 3(a) where the original image along with the watermarked Figure 2(b) one can be viewed. The proposed method produces a high quality watermarked image Figure: 2(c).

Table 1: Calculated PSNR

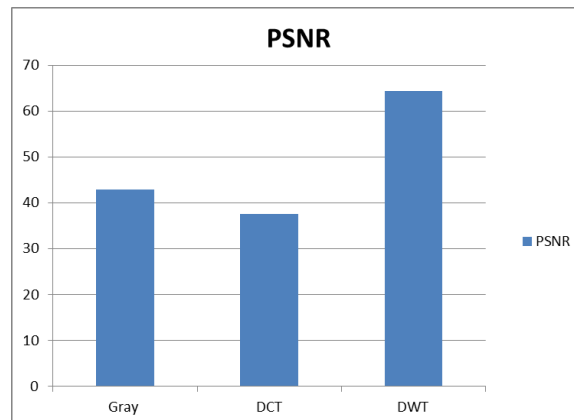| Domain	PSNR/dB
Gray Scale Pixel	42.8678
DCT coefficients	37.6286
DWT coefficients	64.5

Figure 3: Results in Terms of PSNR

CONCLUSIONS

This paper finally concludes that DWT Domain is better than DCT Domain and Gray Scale Domain. In this paper, the PSNR parameters on the basis of their entropy and the interpolation conclude that values obtained are found to be satisfactory. Further results may be improved using other parameters and by comparing with the DWT algorithm.

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